REMARKS

This preliminary amendment is being filed with a Request for Continued Examination. Applicants submit that this preliminary amendment provides a full and complete response to the Final Office Action dated December 4, 2003, having a shortened statutory period for response set to expire on March 4, 2004. Please reconsider the claims pending in the application for reasons discussed below.

Claims 71-87 and 98-113 remain pending in the application and are shown above. Claims 1-70 and 88-97 have been cancelled by Applicants. Claims 71-87 and 98-113 are rejected. Reconsideration of the rejected claims is requested for reasons presented below.

Applicants have amended claims 87 and 106-112 to clarify the invention. Applicants have replaced the phrase "in situ" with "without exposing the substrate to atmosphere." Applicants submit that support for replacing "in situ" with "without exposing the substrate to atmosphere" is found on p. 6, lines 17-18, of the instant application. Applicants submit that the changes made herein do not introduce new matter.

Claims 106-112 stand rejected under 35 U.S.C. § 102(e) as being anticipated by *Xu, et al.* (U.S. Patent No. 6,306,563). The Examiner states that *Xu, et al.* discloses a method comprising depositing one or more of the lower cladding, core layer, and upper cladding layer and heating treating via radiation one or more of the lower cladding, the core layer, and the upper cladding layer in situ following deposition thereof. The Examiner further states that he is interpreting the term "in situ" to mean in the natural or original position, and that "in situ" does not mean without exposing to atmosphere.

As discussed above, Applicants have amended claims 106-112 to clarify that Applicants' original claim language that refers to depositing and heating treating in situ following deposition refers to depositing and then, without exposing the layer to atmosphere, heat treating a layer. Although Applicants believe that the original claim language is clear when read in light of the specification, Applicants have amended the claims for clarity.

Xu, et al. describes a curing step after each of the steps of depositing a lower cladding, a core, and an upper cladding. *Xu, et al.* describes curing by actinic radiation, such as with a lamp or laser, after depositing the lower cladding, a core, and an upper cladding by a spin coating type process (column 7, lines 56-61, column 23, line 49-column 24, line 13). In one example, *Xu, et al.* teaches that a lower cladding is deposited on a substrate on a spin coater, placed in a purge box and exposed to actinic radiation, returned to the spin coater for the deposition of a core material, placed in a purge box and exposed to actinic radiation, and returned to the spinner for the deposition of a lower cladding (column 33, lines 8-38). *Xu, et al.* does not teach or suggest that the curing step is performed such that the deposited layer is cured without exposing the layer to atmosphere. *Xu, et al.* also does not teach or suggest an enclosed processing system including a deposition chamber and a curing chamber that allows for a transfer between the deposition chamber and the curing chamber that is protected from the atmosphere, for curing the layer after deposition without exposing the layer to atmosphere.

Therefore, *Xu, et al.* does not teach, show, or suggest a method of forming an optical device on a substrate, comprising depositing one or more of a lower cladding, a core, and an upper cladding and, without exposing the substrate to atmosphere, heat treating one or more of the lower cladding, the core, and the upper cladding following deposition thereof, as recited in amended claim 106. Applicant respectfully requests withdrawal of the rejection of claim 106, and of claims 107-112, which depend thereon.

Claims 71-72, 74, 87, and 98 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Xu, et al.* The Examiner states that it would have been obvious to modify *Xu, et al.* by using three different chambers to deposit the lower cladding, core layer, and the upper cladding because it would reduce processing time without cleaning the chambers for cross contamination between each step. In response to Applicants' remarks in the Reponse to the Office Action dated June 19, 2003, the Examiner states that *Xu, et al.* never explicitly discloses depositing a lower cladding, a core layer, and an upper cladding on one spin coater. The Examiner further asserts that *Xu, et al.* discloses that the core layer is formed by using the reactive ion etching in one embodiment. Applicants respectfully traverse the rejection.

In Example G, *Xu, et al.* describes depositing a lower cladding on a substrate on a spin coater, transferring the substrate to a purge box and exposing the substrate to actinic radiation, returning the substrate to the spin coater for the deposition of a core material, transferring the substrate to a vacuum jar, transferring the substrate to a purge box, returning the substrate to the spinner, and coating the substrate with an upper cladding (column 33, lines 8-38). Thus, Applicants submit that *Xu, et al.* explicitly discloses depositing a lower cladding, a core layer, and an upper cladding on one spin coater in Example G.

Regarding the Examiner's statement that the core layer is formed by using reactive ion etching in one embodiment (column 4, lines 1-5), Applicants submit that *Xu, et al.* describes depositing a polymerizable core material, at least partially curing the core material, and then patterning, such as by reactive ion etching, the core material to form a core region (claim 19, Figures 2-5). *Xu, et al.* does not describe depositing the core layer by reactive ion etching or depositing the core layer in a reactive ion etch chamber.

Regarding the Examiner's assertion that it would have been obvious to modify *Xu, et al.* by using three different chambers to deposit the lower cladding, core layer, and the upper cladding because it would reduce processing time without cleaning the chambers for cross contamination between each step, Applicants submit that there is no teaching or suggestion in *Xu, et al.* to deposit the lower cladding, core layer, and the upper cladding in three different chambers to reduce processing time by reducing chamber cleaning time. *Xu, et al.* does not discuss cleaning an apparatus used to deposit the layers. Furthermore, there is no motivation in *Xu, et al.* to perform the extra steps of transferring a substrate between three chambers to deposit the layers in three separate chambers, as Example G of *Xu, et al.* illustrates that all three layers can be deposited in one chamber.

In the Advisory Action dated February 25, 2004, the Examiner states that "In col. 7 lines 59-60, *Xu, et al.* discloses 'The film may be applied in a number of different ways known in the art, such as spin coating, dip coating, slot coating, doctor blading, liquid casting or the like.' Therefore, the Examiner still maintains that it is obvious to use three different chambers to deposit the core, lower and upper cladding layer." Applicants

agree that *Xu, et al.* states that the lower cladding may be deposited in a number of different ways known in the art. However, *Xu, et al.* does not make such a statement regarding the deposition of the core and upper cladding. Regarding the deposition of the core and upper cladding, *Xu, et al.* broadly states that the core is applied over the lower cladding, and the upper cladding is applied over the core and lower cladding (column 8, lines 16-18, column 9, lines 18-21). Applicants submit that *Xu, et al.*'s description of depositing a lower cladding in one of a number of ways and general statement that a core and upper cladding are subsequently applied does not provide a suggestion or motivation to deposit the lower cladding, core, and upper cladding in three different chambers.

Therefore, Applicants maintain that *Xu, et al.* does not suggest or motivate depositing the lower cladding, core layer, and an upper cladding in different chambers. *Xu, et al.* does not teach, show, or suggest a method of fabricating multiple optical devices on a glass panel, comprising positioning a glass panel in a first processing chamber, depositing a lower cladding on the glass panel, densifying the deposited lower cladding, positioning the glass panel in a second processing chamber, depositing a core layer on the lower cladding, patterning and etching the core layer to define a pattern of optical devices, positioning the glass panel in a third processing chamber, and depositing an upper cladding over the patterned optical devices, as recited in claim 71. Applicants respectfully request withdrawal of the rejection of claim 71 and of claims 72, 74, and 87, which depend thereon.

Regarding claim 98, Applicants submit that *Xu, et al.* does not teach or suggest positing a substrate in a first deposition chamber, depositing a lower cladding layer on the substrate, and positioning the substrate in a second deposition chamber to deposit a core layer on the lower cladding layer. There is no teaching or suggestion in *Xu, et al.* to deposit a lower cladding layer and a core layer in different chambers. As discussed above, *Xu, et al.* provides an embodiment in which the lower cladding and the core material are deposited on the same spin coater but does not teach or suggest embodiments in which the lower cladding and core are deposited in different chambers. *Xu, et al.* does not teach, show, or suggest a method for forming a portion of an optical device on a substrate, comprising positioning a substrate in a first deposition chamber

on a processing system, depositing a lower cladding layer on the substrate, positioning the substrate in a densification chamber on the same processing system and treating the substrate therein, positioning the substrate in a second deposition chamber to deposit a core layer on the lower cladding layer, and then positioning the substrate in the densification chamber on the processing system and treating the substrate therein, as recited in claim 98. Applicants respectfully request withdrawal of the rejection of claim 98.

Claims 84-86 and 99-102 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Xu, et al.* in view of *Nishimoto* (U.S. Patent No. 5,408,569). Applicants submit that *Xu, et al.* in view of *Nishimoto* does not provide all of the limitations of claims 71 and 98, upon which claims 84-86 and 99-102 respectively depend. As discussed above, *Xu, et al.* does not provide all of the limitations of claims 71 and 98. *Nishimoto* describes methods of forming optical waveguides, but does not describe the apparatus used to form the layers of the wave guides. Thus, the combination of *Xu, et al.* and *Nishimoto* does not provide a process comprising positioning a glass panel in a first processing chamber, depositing a lower cladding on the glass panel, densifying the deposited lower cladding, positioning the glass panel in a second processing chamber, depositing a core layer on the lower cladding, patterning and etching the core layer to define a pattern of optical devices, positioning the glass panel in a third processing chamber, and depositing an upper cladding over the patterned optical devices, as recited in claim 71. The combination of *Xu, et al.* and *Nishimoto* does not provide a process comprising positioning a substrate in a first deposition chamber on a processing system, depositing a lower cladding layer on the substrate, positioning the substrate in a densification chamber on the same processing system and treating the substrate therein, positioning the substrate in a second deposition chamber to deposit a core layer on the lower cladding layer, and then positioning the substrate in the densification chamber on the processing system and treating the substrate therein, as recited in claim 98. Applicants respectfully request withdrawal of the rejection of dependent claims 84-86 and 99-102.

Claims 73, 75-81, and 83 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Xu, et al.* and *Nishimoto*, in view of *Veligdan, et al.* (U.S. Patent No.

6,222,971). Applicants submit that *Xu, et al.* in view of *Veligdan, et al.* does not provide all of the limitations of claim 71, upon which claims 73, 75-81, and 83 depend. As discussed above, *Xu, et al.* does not provide all of the limitations of claim 71. *Veligdan, et al.* describes methods of forming layers of an optical waveguide, including dip coating or bonding the layers (column 6, lines 1-23), but does not describe the apparatus used to deposit the layers. Thus, *Xu, et al.* in view of *Veligdan, et al.* does not teach, show, or suggest positioning a glass panel in a first processing chamber, depositing a lower cladding on the glass panel, densifying the deposited lower cladding, positioning the glass panel in a second processing chamber, depositing a core layer on the lower cladding, patterning and etching the core layer to define a pattern of optical devices, positioning the glass panel in a third processing chamber, and depositing an upper cladding over the patterned optical devices, as recited in claim 71. Applicants respectfully request withdrawal of the rejection of dependent claims 73, 75-81, and 83.

Claim 82 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Xu, et al.*, in view of *Gessel*, (U.S. Patent No. 5,396,351). Applicants submit that *Xu, et al.*, in view of *Gessel* does not provide all of the limitations of claim 71, upon which claim 82 depends. *Gessel* describes multilayer structures included a polarized fiber-optic layer for flat panel LCD screens. *Gessel* does not teach or suggest an apparatus or a sequence of chambers for depositing a lower cladding, a core layer, and an upper cladding. As discussed above, *Xu, et al.* does not provide a process comprising positioning a glass panel in a first processing chamber, depositing a lower cladding on the glass panel, densifying the deposited lower cladding, positioning the glass panel in a second processing chamber, depositing a core layer on the lower cladding, patterning and etching the core layer to define a pattern of optical devices, positioning the glass panel in a third processing chamber, and depositing an upper cladding over the patterned optical devices, as recited in claim 71. Applicants respectfully request withdrawal of the rejection of dependent claim 82.

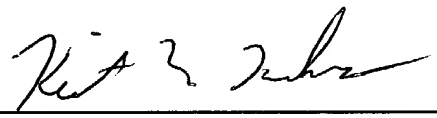
Claim 113 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Xu, et al.*, in view of *Veldhuis, et al.* (U.S. Patent No. 6,377,716). Applicants respectfully traverse the rejection. The combination of *Xu, et al.* and *Veldhuis, et al.* does not provide all of the limitations of claim 98, upon which claim 113 depends. *Veldhuis, et al.*

describes depositing and etching a SiON layer and then spin coating and curing a core polymer before depositing and curing a match polymer layer. *Veldhuis, et al.* does not describe the apparatus in which the layers are deposited and treated. As discussed above, *Xu, et al.* does not provide a process comprising positioning a substrate in a first deposition chamber on a processing system, depositing a lower cladding layer on the substrate, positioning the substrate in a densification chamber on the same processing system and treating the substrate therein, positioning the substrate in a second deposition chamber to deposit a core layer on the lower cladding layer, and then positioning the substrate in the densification chamber on the processing system and treating the substrate therein, as recited in claim 98. Applicants respectfully request withdrawal of the rejection of dependent claim 113.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

Having addressed all issues set out in the Final Office Action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



Keith M. Tackett
Registration No. 32,008
MOSER, PATTERSON & SHERIDAN, L.L.P.
3040 Post Oak Blvd. Suite 1500
Houston, TX 77056
Telephone: (713) 623-4844
Facsimile: (713) 623-4846
Attorney for Applicant(s)